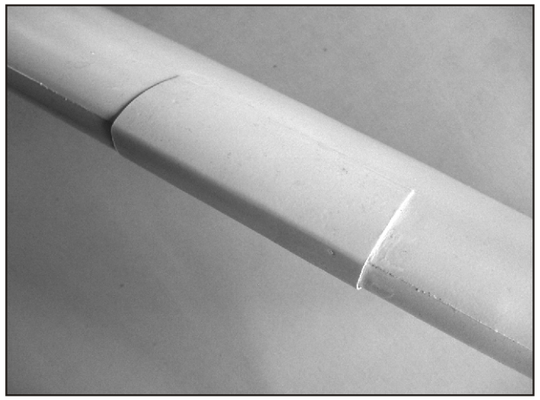
REPAIR

This kind of airplane is far different from the traditional wood made airplane covered with covering, it is all plastic includes the fuselage, wing and tail feathers. Enclosed in the kit, there is a repair bag includes a super glue, epoxy and ABS sheets. Use the furnish materials to repair your plane if there is any damaged. Cut a proper size of ABS sheet for the crack area as a patch, sand the glue area with 300-400 grit sand paper first, this will enhance the adhesion. Patch the crack area or anywhere need to be reinforced with super glue. Use epoxy instead of super glue if contacts any foam inside the wing. Check Thunder Tiger authorized distributors for customer service or tech support if any problem is encountered.



MEMO

Thunder Tiger

Cessna A Textron Company
Official Licensed Product
68-5906-42244

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Cessna® 177 Cardinal

Assembly Manual

No.4595

Specifications:

Wing Span:	67.00" (1700mm)
Wing Area:	682 sq.in. (44 sq. dm^2)
Length:	49.20" (1250mm)
Weight:	6.60 lbs.(3000g)
Engine:	.61 2C Req'd .91 4C Req'd
Radio:	4CH Req'd

Warranty

This kit is guaranteed to be free from defects in material and workmanship at the date of purchase. It does not cover any damage caused by use or modification. The warranty does not extend beyond the product itself and is limited only to the original cost of the kit. By the act of building this user-assembled kit, the user accepts all resulting in liability for damage caused by the final product. If the buyer is not prepared to accept this liability, it can be returned new and unused to the place of purchase for a refund.

JE6982

Introduction

Thanks for purchasing the ABS (ABS is a “polymericed alloy” of the three materials **A**crylonitrile, **B**utadiene and **S**tyrene) series airplane from Thunder Tiger, this kind of airplane is far different from the traditional wood made airplane covered with covering. The plane is all plastic includes the fuselage, wing and tail feathers which are impact and water resistance that we ensure you will have longer enjoy time with this product.

This is not a toy. Assembly and running this product requires adult supervision. To gain the most from this airplane kit, it is important that you read the instructions thoroughly and then follow them exactly. This instruction manual has been written with a novice modelers in mind, but includes many hints and modeling tips that even experienced modeler can benefit from. We strongly suggest that you read through the construction sequence and eliminate many questions you might have if you did not read the manual prior to starting the actual construction.

The first thing you should do before beginning assembly is to check the contents of your kit against the parts list on pages 4 and 5. If any parts are missing, contact your dealer or authorised Thunder Tiger Distributors immediately for replacement. Browse www.thundertiger.com for more information or customer service if you encounter any problems.

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ITEMS REQUIRED FOR ASSEMBLY

A checklist is also provided on the next page which will make shopping for these items easier.

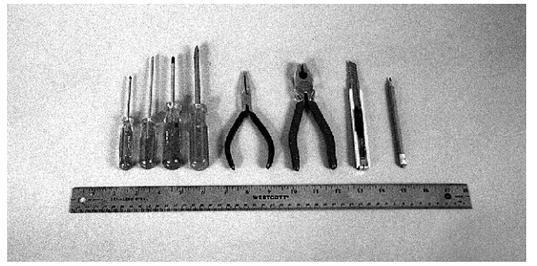
Radio - A4- channel radio with 4 standard servos is required. Most lower priced 4-channel radios only come with three standard servos so you may need to purchase the fourth servo separately.

ACCESSORIES

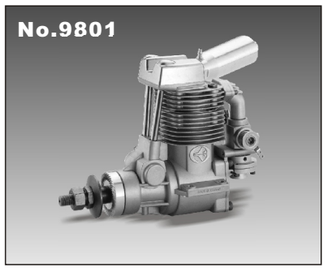
No.1263-65

Carry Master-Thunder Tiger offer a complete organizer of field equipment. All you need is included.

Adhesives- You will need two types of adhesives for the Cessna 177- Epoxy and Instant (cyanoacrylate) adhesives. We recommend that you purchase both 5-minute and 30-minute epoxy to cut down on assembly time, but you can get by with only 30-minute epoxy if time is no important. You will also need a small bottle of both "Thick" and "Thin" instant adhesive.



Tools-Model assembly can be much easier if the proper tools are used. Therefore we have included in our checklist to above, a complete listing of all the tools we used to assemble our prototype models. As you will notice, many household tools can be utilized during construction.



Engine The Thunder Tiger PRO-61 and F-91S are the ideal engines for this airplane. These quiet running engines are easy to start, require no special break in periods, are very easy to maintain and will last for years.

Flight Equipment There are several “support” items that you will need to purchase in order to get your engine running and your plane in the air. These are listed at the bottom.

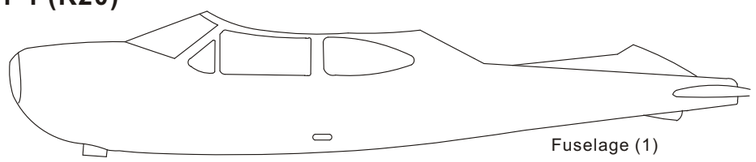
Flight Equipment Needed Check List

- Foam Rubber Padding for the radio
- Stick on Lead Strip for balancing the plane
- 3 or 4 Props (see engine instructions)
- 10%-15% Glow Fuel
- Fuel Pump or Bulb
- Electric Starter or “ Chicken Stick”
- Glow starter
- Extra Glow Plug(s)
- Silicon Tubing

Comprehensive Items Needed Check List

- 4-Channel Radio with 4 Standard Servos
- 5-Minute Epoxy (4 ounces or so)
- 30-Minute Epoxy (4 ounces or so)
- “Thin” Instant Adhesive (1/2 ounce)
- “Thick” Instant Adhesive (1/2 ounce)
- Hobby Knife and Blades
- Epoxy Mixing Sticks and/or Brushes
- Sandpaper (150 grit)
- Masking Tape
- Rubbing Alcohol
- Paper Towels
- Ruler
- 90 Degree Triangle
- Waxed Paper
- Fine-Point, Felt-Tip Pen
- Misc. Household Tools
- Drill and Bits 2mm,5mm,8mm (5/64", 13/64", 5/16")

AS6681 Fuselage Set
AS6681-1 (K20)



Fuselage (1)

Rubber Band (2)

Fuel Tank Support (1)

Nut Support A (1)

Nut Support B (1)

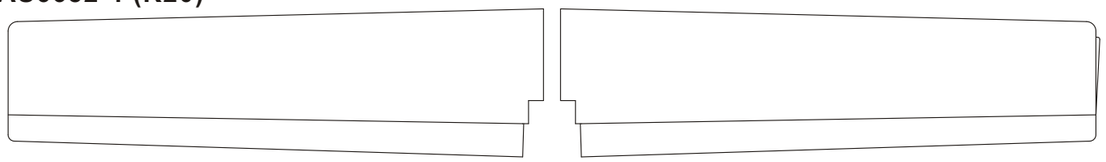
Muffle Fairing (1)

Centre Bulkhead (1)

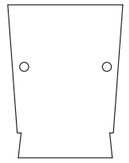
Firewall (1)

Servo Tray (1)

AS6682 Main Wing Set
AS6682-1 (K20)



Main Wing (L/1,R/1)

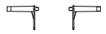


Center Sleeve (1)

Aileron End Cap (2)

Wood Stick (1)

Rod Support (L/1,R/1)



Connecting Rod (L/1,R/1)

Wing Joiner (1)

Aileron Servo Rail U (1)

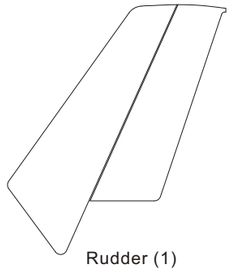
Aileron Servo Rail V (1)

3x10mm Wood Screw (4)

Wing Bolt (2)

M7 Hex Nut (2)

AS6683 Vertical Tail Set
AS6683-1 (K20)

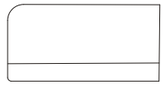


Rudder (1)

Rudder Control Horn A (1)

Rudder Control Horn B (1)

AS6684 Horizontal Tail Set
AS6684-1 (K20)



Horizontal Tail (2)

Elevator Control Horn (1)

Foam Block (1)

Elevator Spar (1)

AS6685
Engine Mount Set

Engine Mount (1)

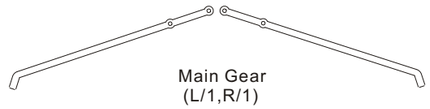
Engine Mount Back Plate(1)

Hex Nut (3)

4x25mm Screw (3)

4x24mm Self -tapping Screw (4)

AS6686 Main Landing Gear Set



Main Gear (L/1,R/1)

4X30mm Socket Screw (3)

4X35mm Screw (2)

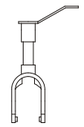
M4 Locknut (2)

Hex Wrench (1)

M4 Nut (5)

M4 Cone (3)

AS6687 Nose Gear Set



Nose Gear (1)

Nose Gear Mount A (1)

Nose Gear Mount B (1)

3x3mm Setscrew (1)

Damper Linkage(1)

Nose Gear Back Plate (1)

Nose Gear Wire(1)

3x25mm Wood Screw (3)

Nose Gear Spacer(1)

Wheel Collar (1)

M4 Locknut (1)

4X40mm Socket Screw (1)

AS6688 400cc Fuel Tank

Cap (1)

Back Plate (1)

Clunk (1)

3x20mm Self -tapping Screw (1)

Silicon Tube (1)

Rubber Stopper (1)

Silicon Ring (1)

Bent Brass Tube (2)

Brass Tube (1)

Fuel Tank (1)

AS6689 Linkage Set

Threaded Adaptor (2)

Wire 2M (1)

Aileron Pushrod (2)

Z-Bend End W / Hole (2)

Threaded End W / Hole (2)

Nose Gear Pushrod (1)

Brass Tube (4)

Throttle Pushrod (1)

Clevis (6)

CFK Pushrod (1)

3169 EZ Connector Set

Hex Wrench (1)

3x3mm Setscrew (2)

Pushrod Retainer (2)

M2 Nut (2)

M2 Washer (2)

3282W Spinner

Spinner (1)

Backplate (1)

3x12mm Self -tapping Screw (2)

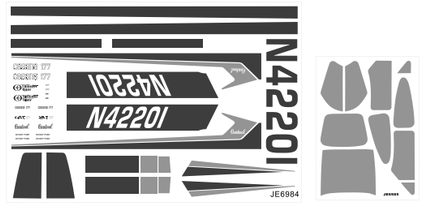
AS6675
Screw Driver

Screw Driver (1)

3297 Wheel

Wheel (3)

AS6690 Decal (Only comes with 4595-K10)



Decal (1)

AS6691 Decal
(Only comes with 4595-K20)

Decal (1)

AS6680
Repair Bag

ABS(2)

CA Glue(1)

Epoxy(1)

PRE-ASSEMBLY NOTES

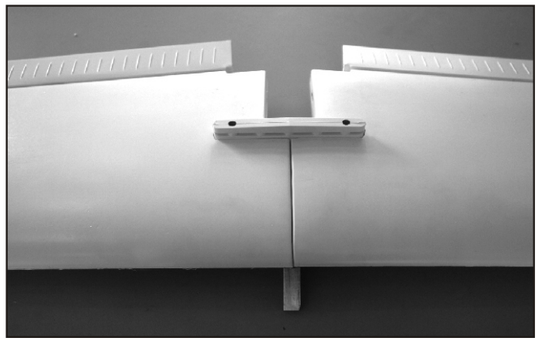
1. If you are not an experienced pilot, plan to have a fully competent pilot check your completed model and help you with your first flights. Even though we have tried to provide you with a very thorough instruction manual, models are rather complicated and an experienced modeler can quickly check over your model to make sure your first flights are successful.

2. Please assemble your model exactly according to these instructions. Do not attempt to modify or change the **Cessna 177** in any way as doing so may adversely change its flying characteristics.

3. Before you begin, please check the entire contents of this kit against the parts drawing make sure that no parts are missing or damaged. This will also help you to become familiar with each component of your plane. If you find that any of the parts are either missing or damaged, please contact your dealer immediately for replacement.

Note: Your dealer cannot accept kits for return if construction has begun.

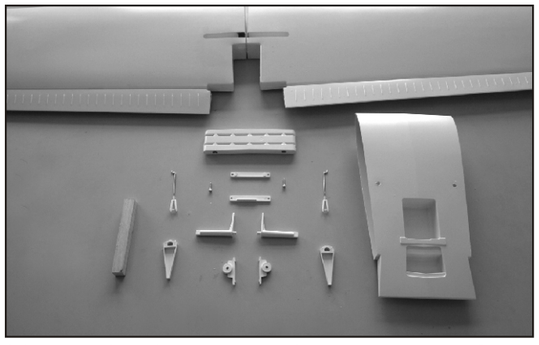
4. Trial fit each part before gluing it in place. Make sure you are using the correct part and that it fits well before assembling. No amount of glue can make up for a poor fitting part.



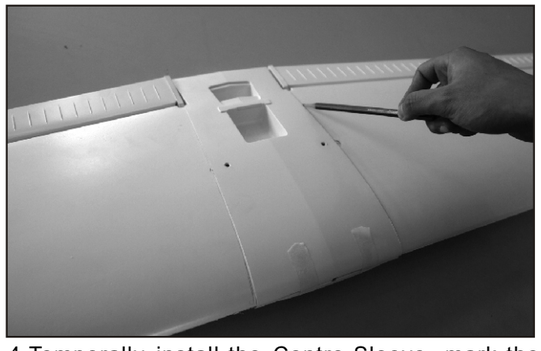
2.Trail fit the wing joiner, make sure it is level with the wing surface. Next apply enough epoxy to joiner and wing slot cut. Epoxy this wing joiner in place with the wood stick under two wing halves, this is for correct " Dihedral" of the main wing.

3.Locate two Aileron End Caps, then CA them in place. Drill the wing bolt hole through the wing with 8mm drill bit.

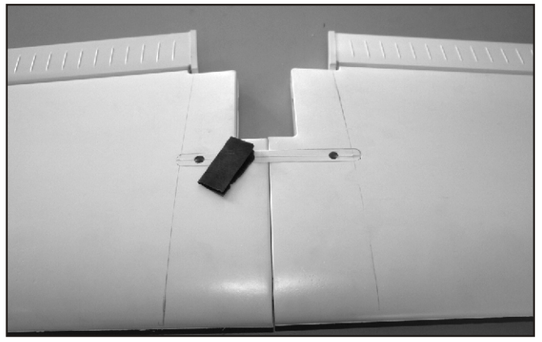
WING ASSEMBLY



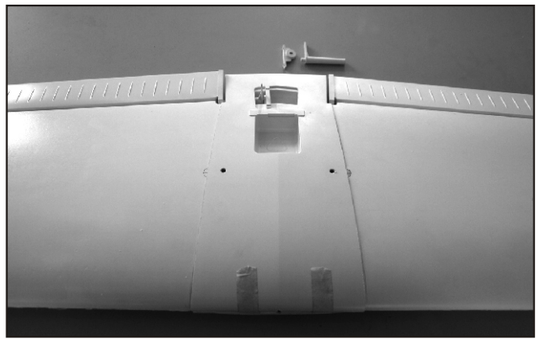
1.Locate the wing parts as shown, you may refer to the parts drawing of main wing set in page 4.



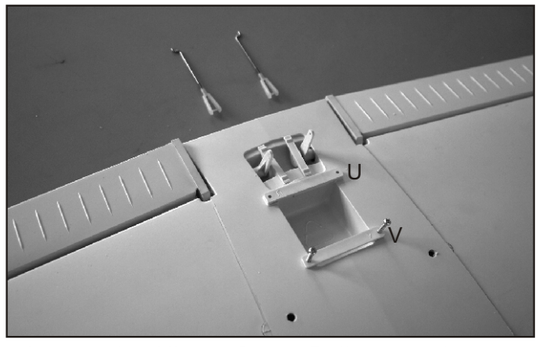
4.Temporally install the Centre Sleeve, mark the guide lines on both wing surface when it centered.



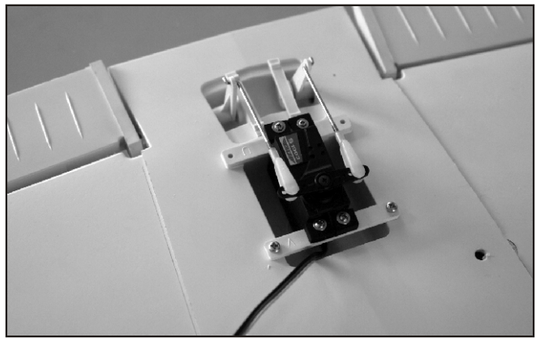
5.Sand the wing center area where is going to glue the Centre Sleeve. This is to enhance the adhesion.



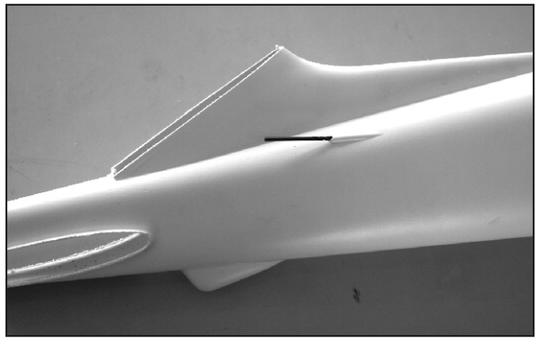
6.Glue the Centre Sleeve in place with epoxy or thick CA. Next install the aileron Connecting Rod and Rod Support. Make sure leave 1mm between the control horn and support bearing.



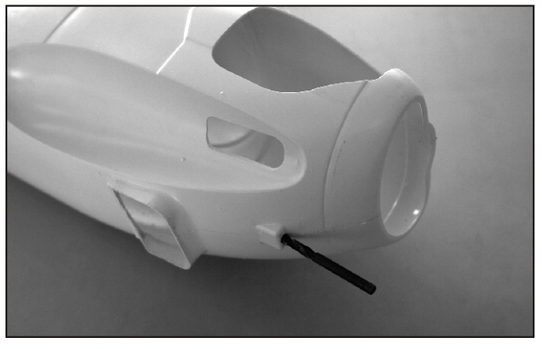
7.Locate the Aileron Servo Rails, note the servo rail will have to accommodate to your servo size before you secure on the aileron servo well. Also make sure the Rails are at right positions.



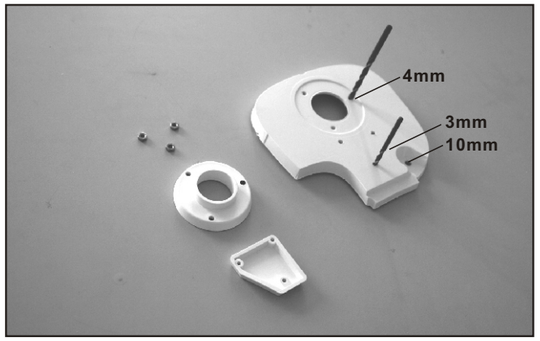
8.Secure the aileron servo in place. Next thread the clevis onto the aileron pushrod, insert the Z-bend end to the aileron control horn then snap on the clevis to the servo horn as shown.
Suggest to install two servos and set up the "FLAPRON", this will help the landing slower.



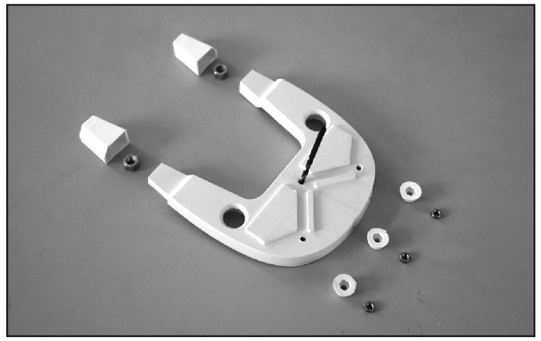
9.Drill 2mm holes for the rudder pull-pull wire as photo shown.



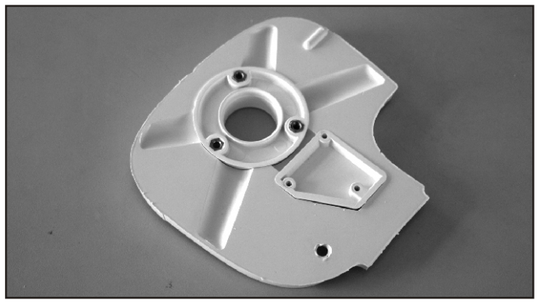
10.Drill 5mm inlet hole as photo indicated.



11.Using a 4mm drill bit to drill through the front bulkhead for the engine mounting screws. Drill 3mm holes for the nose leg mounting holes on the firewall. Drill 10mm hole for the steering pushrod as photo shown.

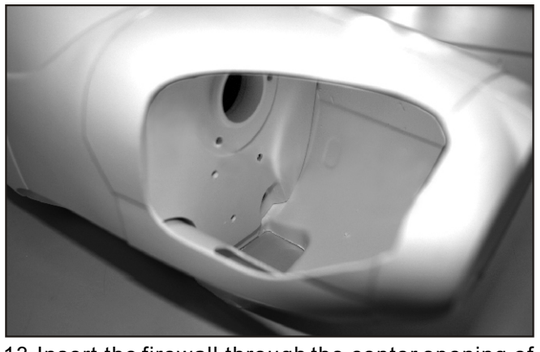


14.Drill three 4mm holes in the positions of centre bulkhead.

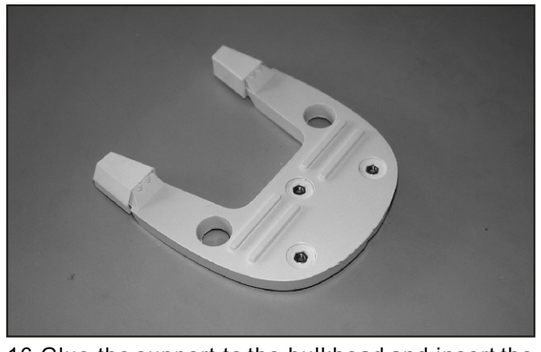


12.Glue the Engine Mount and Nose Gear Back Plates in the firewall, make sure the holes are aligned. Fit the 4mm nuts into the Engine Mount Back Plate.

15.Place the cones in the position of centre bulkhead and CA them in place. Insert the M7 nuts in the nut support.

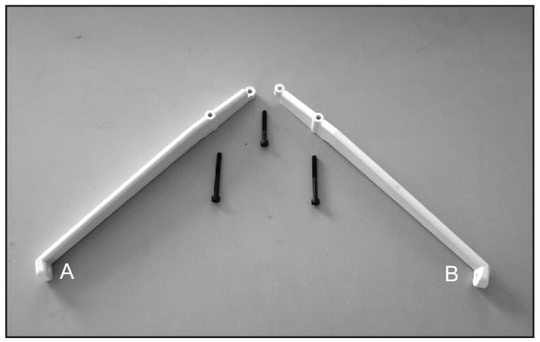


13.Insert the firewall through the center opening of the fuselage and place in right position. You may need to push the firewall forward to the place until it fits correctly in the formed recess.

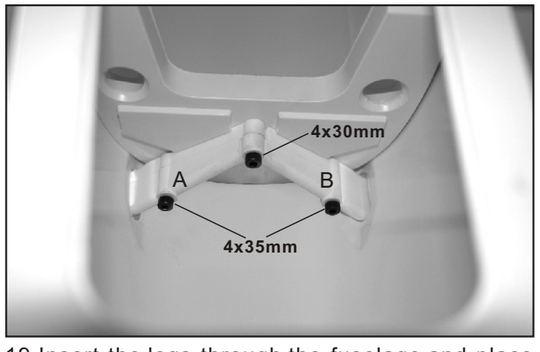


16.Glue the support to the bulkhead and insert the M4 nuts in the cones.

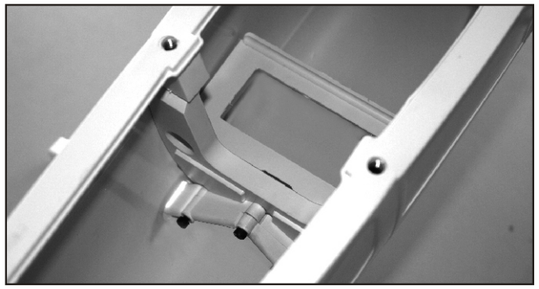
17.Both sand the glue area on bulkhead and fuselage. Trail fit the assembled bulkhead into the position as photo shown. You may use the furnished screw driver thread through the fuselage and bulkhead is against the screw driver. Note the screw driver should move forward to the very end. CA the bulkhead in place firmly.



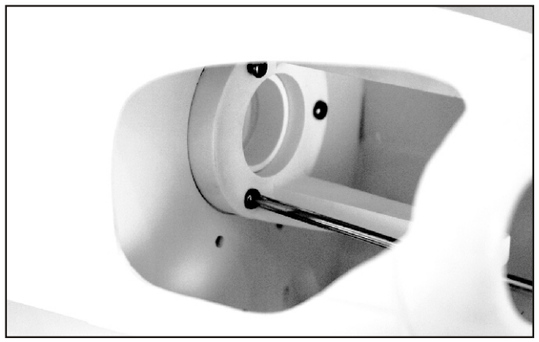
18. Locate the Main Landing Gear and mounting screws as shown.



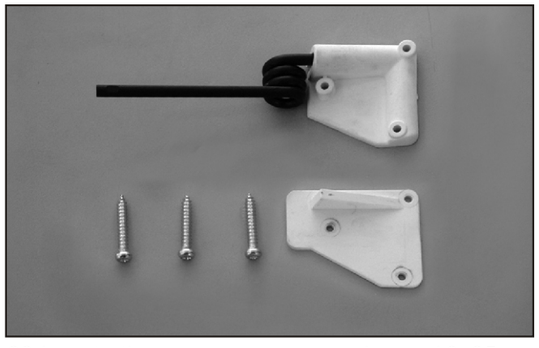
19.Insert the legs through the fuselage and place on the bulkhead then secure the main gear firmly with two 4x35mm screws and one 4x30mm socket screw.



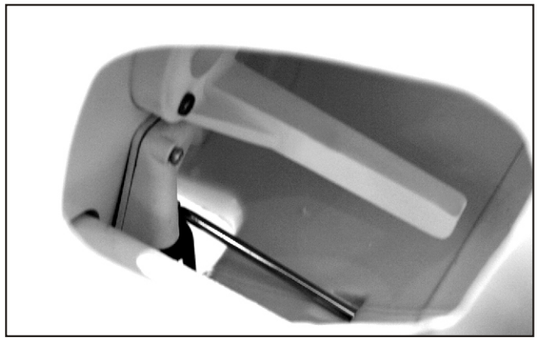
20. Trail fit the servo in the servo tray, trim the servo tray if it is necessary. Next trail fit the servo tray into fuselage and slide into the position locking the front of the tray into the recess of the central bulkhead. Remove the servo tray and slightly sand the glue area then CA the servo trail in place.



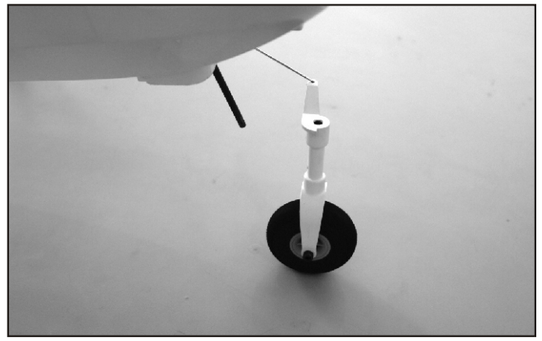
21.Locate the engine mount then secure the engine mount in place with three 4x25mm screws.



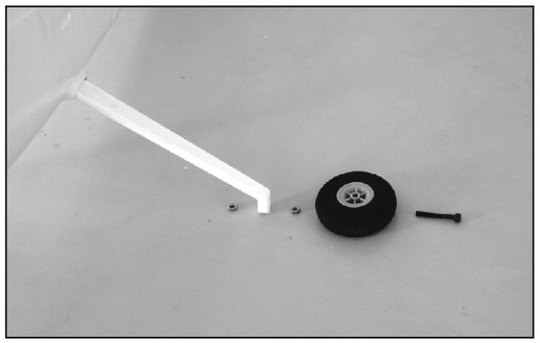
22.Locate the nose gear accessories and 3x25mm wood screws as shown.



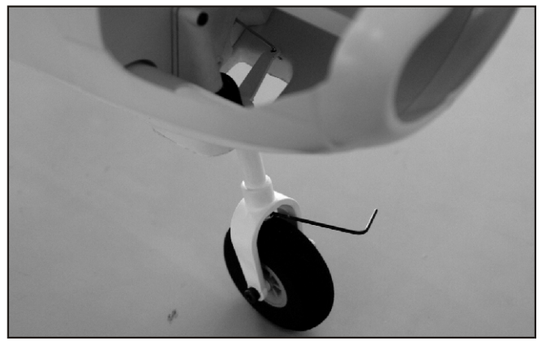
23.Sandwich the Nose Gear Wire with the Nose Gear Mount, then secure mount firmly in place with three 3x25mm wood screws.



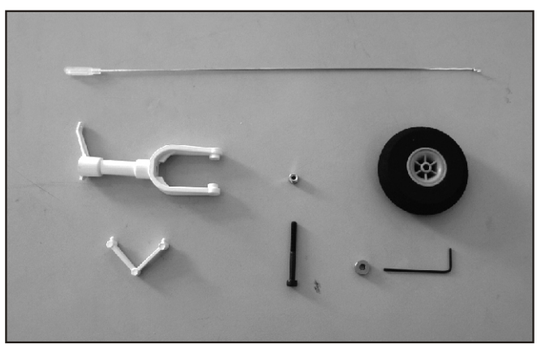
26.Assemble the scale nose gear, make sure wheel could rotate freely. CA the Damper Linkage on the Scale Nose Gear. Next thread the Z-bend end to the steering arm.



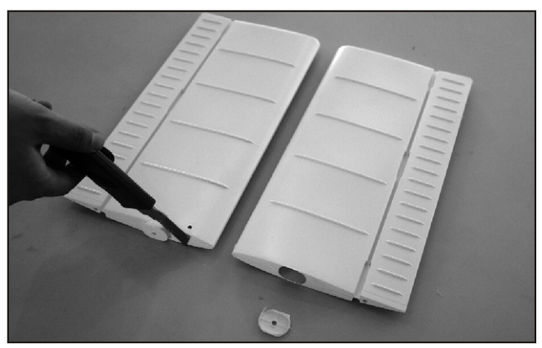
24.Install the wheel on the main gear with 4x30mm socket screw one M4 nut and one M4 locknut. Do the same on the other side.



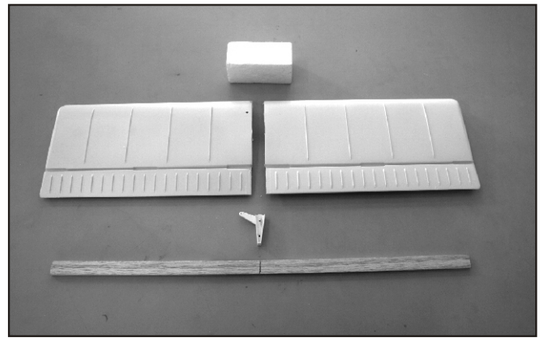
27.Thread the nose gear pushrod into the fuselage then install the scale nose gear onto the nose gear wire the secure it in place with collar and 3x3mm setscrew.



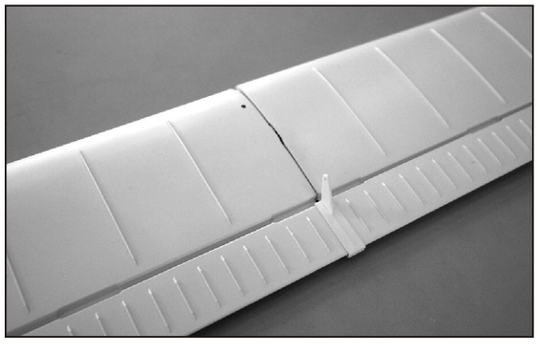
25.Locate the scale nose gear accessories as shown. Thread the clevis onto the pushrod.



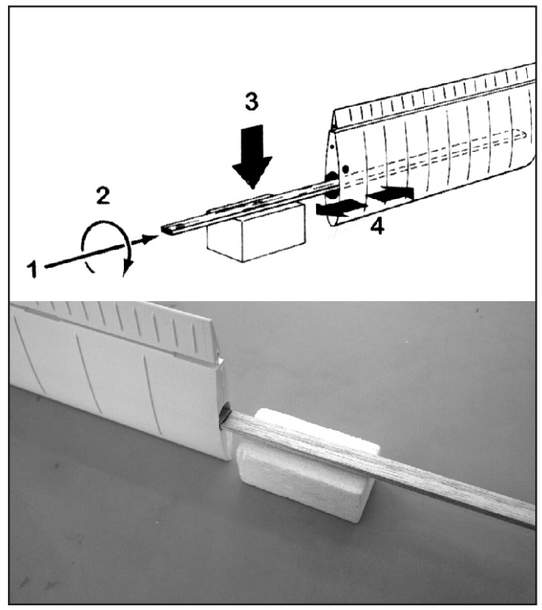
28.Locate the horizontal tail halves then use hobby knife carefully trim away the molded cap at the root of the tail halves for the elevator spar.



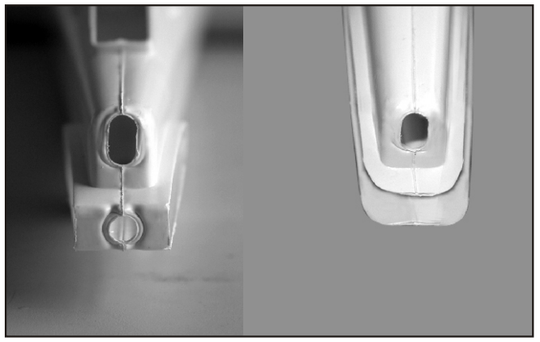
29. Make mark at the center of the tail spar as shown.



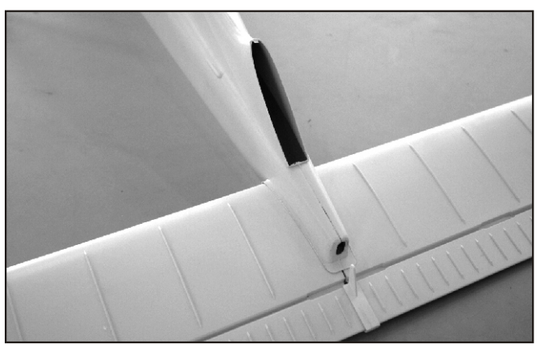
31.When epoxy has cured, repeat the operation with the other tail half with the addition of more epoxy on the roots of the tail to glue two halves together. You may use mask tape to hold two halves together until it cures. Make sure two halves are aligned accurately. CA the Elevator Control Horn in place firmly as shown.



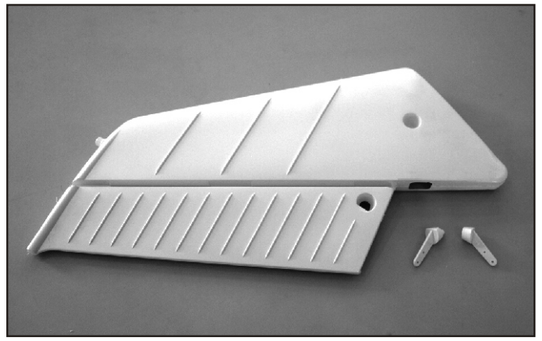
30.Pay Attention to the Spar Installation: Apply a generous coat of epoxy to the narrow edges of the spare on one side only of the halfway point. Hold the spare horizontally so the epoxied edges face to the leading and trailing edges of the tail, then insert it in the tail up to the marked point(step 1). When arrive the marked point then carefully rotate the spar (step 2). Place the tail half leading edge down on flat surface and support the extended part of the Foam Block(step 3). Move it back and forth for about 5mm two or three times to even distribute the epoxy(step 4).



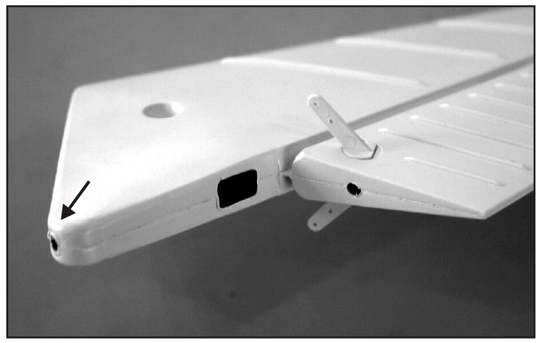
32.You may use file to enlarge the elevator pushrod exit hole so clevis will not contact the fuselage. Also trim the fuselage end as shown so horizontal tail can go in.



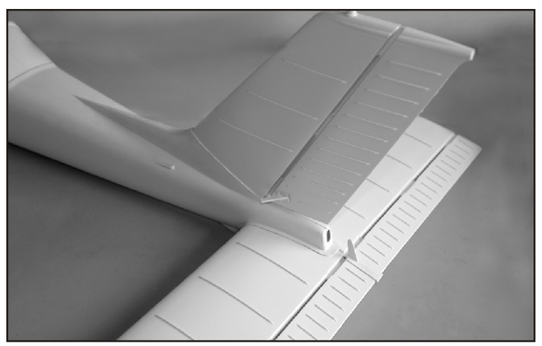
33.Temporarily install main wing in place with the two Wing Bolts. Trail fit the tail in place and check the alignment with the wing and fuselage. The tail should be parallel to the wing when looking forward from the rear and top of the model. When satisfied, make mark on the tail along the fuselage. Remove the tail and slightly sand the glue area then CA tail in place.



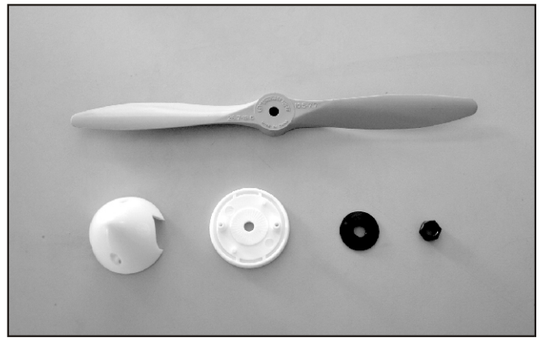
34.Locate the Vertical Fin and Rudder Control Horns, cut away the molding caps on the base of the fin. This is for pushrod can go through.



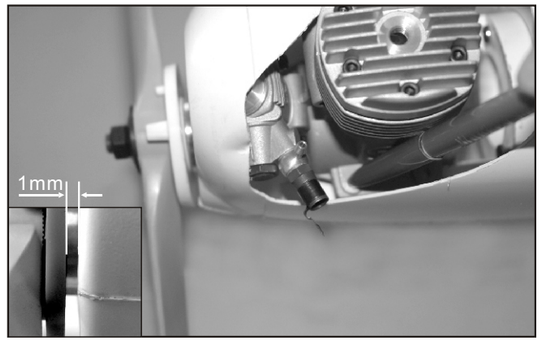
35.Fit the two rudder control horns to the rudder, pushing them firmly together. CA each control horn around the base in place. Pour a few drops of epoxy into indicated hole.



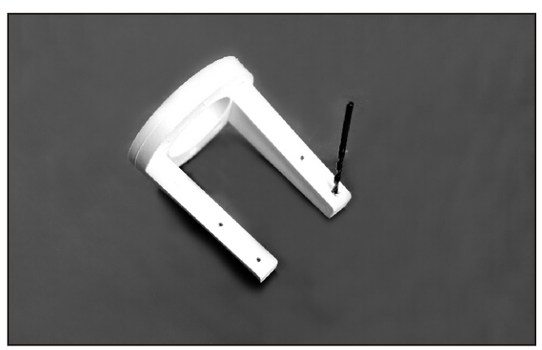
36.Insert the fin into the fuselage before the epoxy cures, make sure the fin sits vertically to the horizontal tail. CA the fin to the fuselage firmly.



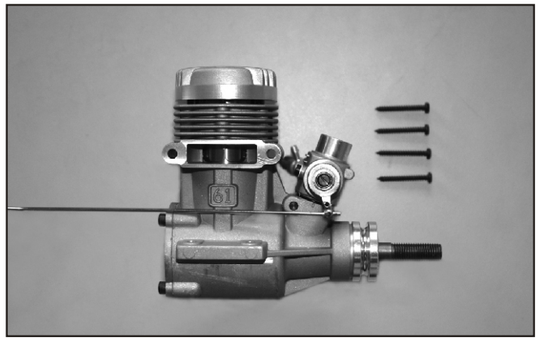
37.Locate the spinner , engine prop nut, washer and prepare a suitable propeller for your engine.



38.Temporarily fit the engine to the engine mount and install the propeller and spinner being used. Slide the engine on the mount until there is about 1mm (1/16”) gap between the back plate and the front of fuselage. Make mark of the engine mounting holes. It may need to trim the engine opening to fit your engine.

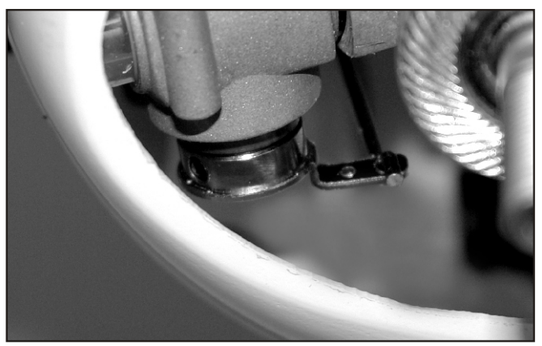


39.Remove the engine and mount from the fuselage. Drill 3.6mm hole(9/64”) on the marks for 4x20mm self tapping screws.



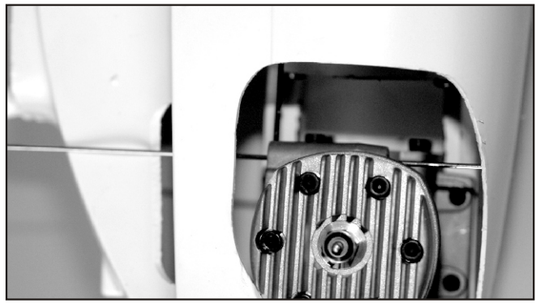
40.Locate the throttle pushrod and engine mounting screws. Connect the throttle pushrod to the throttle lever.

41.Thread the pushrod through the firewall.

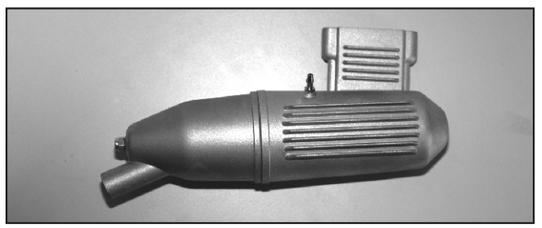


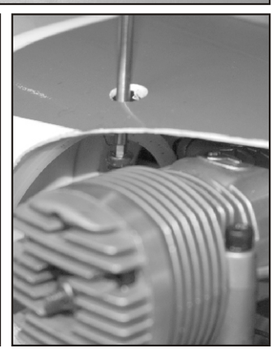
42.Next place engine on the engine mount. Trail to move the pushrod back and forth to make sure the throttle lever moves smoothly. Bend the pushrod if necessary.

43.Secure the engine on the engine mount firmly with the furnished mounting screws.

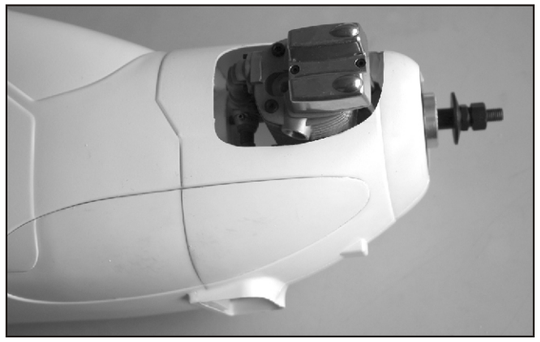


44.Use the muffler hole as the guide to drill a hole on the cowl. Enlarge the hole up to 6mm in diameter so you can thread the muffler bolt in.

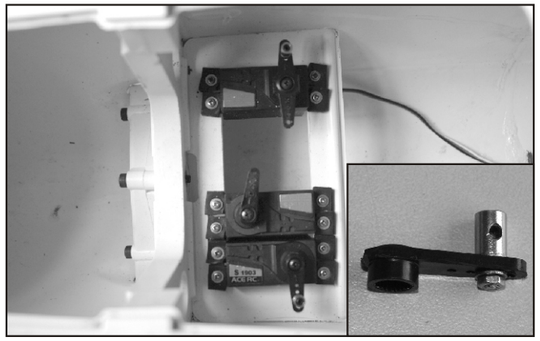




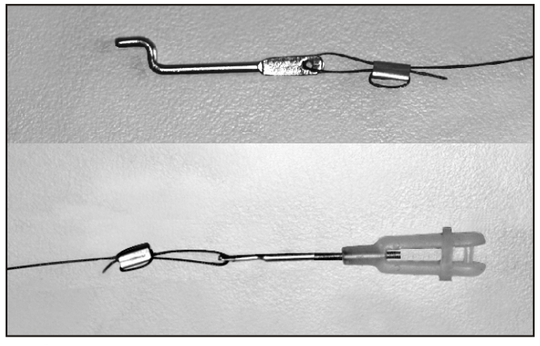
45.Secure the muffler tightly with the muffler bolts that come with your engine.



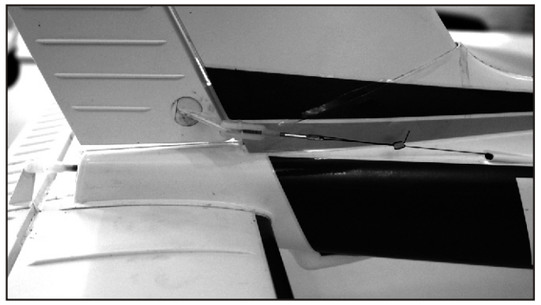
46.If a 4 stroke engine is used , then glue the Fairing to the muffler well. The pushrod hole on the firewall may need to drill to accommodate to your 4 stroke engine throttle lever.



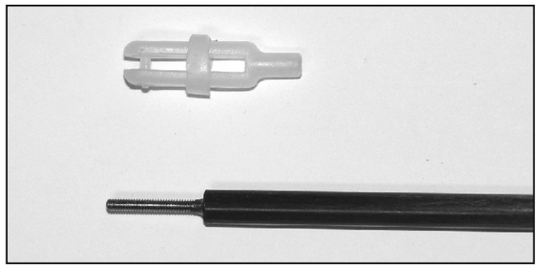
47.Install the servo in place, you will need to install EZ connectors on the servo horns for rudder servo and throttle servo(both suggested on the second hole).



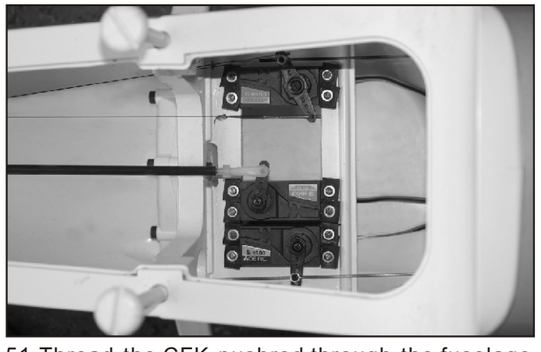
48.Cut the cable into two pieces. Next drill a small hole in the fairing at the rear top of fuselage. Thread the cable from the hole through the fuselage to the servo tray. Use a piece of tape to fix the cable at the fairing from loosening. Now loop the Z-Bend End first.(first thread the brass tube, next thread the Z-bend end, go back to the brass tube again. Adjust the distance between the Z-bend end and the tube then thread the cable through the brass tube again and make a circle as small as possible. Clamp the brass tube with pliers to lock the cable from loosening. Insert the Z-Bend Ends to the rudder servo horn at the outmost holes. Note: make sure two cables are cross each other.



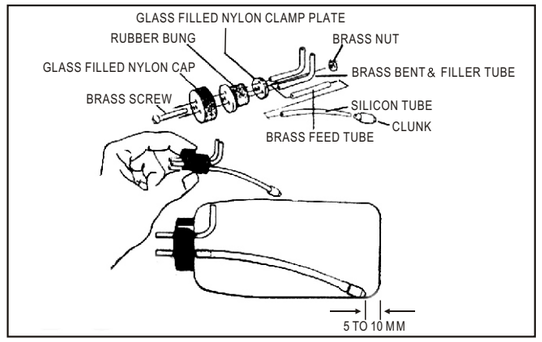
49.Locate the Threaded End w/hole, thread it into the Clevis at least 6mm, then loop the other end of cable as you did on Z-Bend End. Snap on the clevis to the rudder control horn then adjust the tension. Make sure both cables are equal then clamp the brass tube. You can adjust the tension slightly by threading in the clevis.



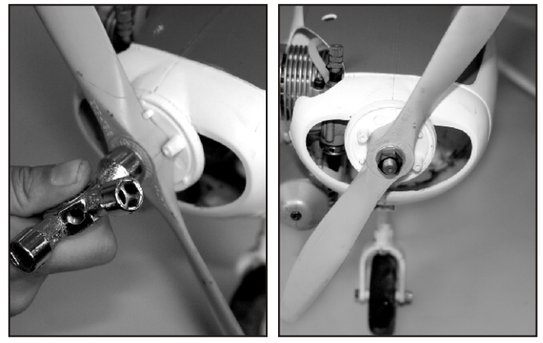
50. Firstly trim the CFK Pushrod in length of 690mm(27-5/32"),next locate the Threaded Adaptor, slightly sand the glue area of adaptor to make sure there is no oil on it. Apply enough epoxy to glue the adaptors in the CFK Pushrod at two ends as shown. Thread the clevises on the adaptor after epoxy has cured. Apply a silicon ring to the clevis.



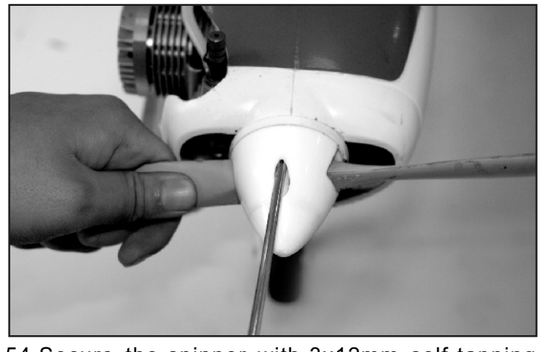
51.Thread the CFK pushrod through the fuselage and snap on the control horn. Adjust the silicon ring to keep clevis from loosening. Snap on the other end to servo horn when elevator and servo are both in neutral position. Adjust clevis if necessary.
Thread the Throttle pushrod and Steering pushrod through the EZ Connectors. Adjust the pushrod when they are in neutral position.



52.Assemble the tank as figure; install the silicon rubber ring on the tank and insert the tank in the opening of the firewall. Insert the Tank Support and attach it under the fuel tank. You may use rubber band to hold the tank on support. Next glue the support inside the fuselage with CA.



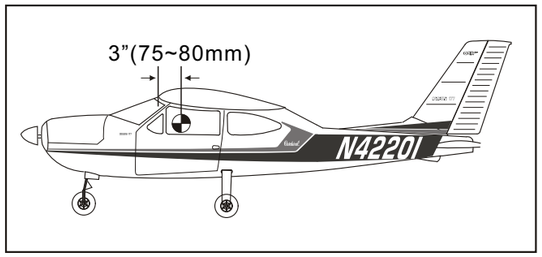
53.Finally install the propeller and spinner, note the propeller must be secured against the pin on the spinner back plate. Always adjust the propeller at a good starting angle.



54.Secure the spinner with 3x12mm self-tapping screws.

55.Connect the fuel tube properly to the muffler and carburetor.

BALANCE



CONTROL THROWS

Make sure the direction of servo moves correctly. If not switch the reversing switch on the transmitter. If the control surface does not move far enough, either move the pushrod out farther on the servo horn or move the clevis in farther on the control horn. If the control surface moves too much, either move the pushrod in on the servo horn or move the clevis out farther on the control horn. Adjust the control throws as the initial setting as follows: